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## Signals from galactic rebel

### ***Astronomer detects radio emissions from center of Milky Way***

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There might not be anything new under the sun, but a Virginia astronomer thinks he's found something new, a radio rebel, in the galactic center.

A series of surprising bursts of radio energy appear to originate from a unique source located as far as 26,000 light years from Earth. Their unexpectedly bright presence was captured in images taken by telescopes searching at low frequencies, a little more than a yard in wavelength.

Their source, formally known as GCRT J1745-3009, "doesn't fit well into any of the known categories," said Scott Hyman, professor of physics at Sweet Briar College.

If the source is indeed near the Milky Way's center, it could be one of the most powerful emitters in the galaxy. The shape and timing of the pulses rule out most known sources, such as pulsars, whose clocklike signals make them the "lighthouses" of the galaxy.

"It's a real oddball. For us, it's more likely that it's a new class of object," Hyman said.

Of the conventional possibilities, Hyman said he favors the magnetar, a corpse of a massive star with a super-strong magnetic field, but it's not a perfect match.

"If it was a magnetar, it would be a very strange one," said Hyman, who along with collaborators at the Naval Research Laboratory, NASA's Laboratory for High Energy Astrophysics and Northwestern University describe the nonconformist in today's issue of Nature.

In a separate piece in Nature, astronomers Shri Kulkarni and E. Sterl Phinney of California Institute of Technology call Hyman's claim plausible, but say the most likely conventional explanation is a nulling pulsar, which pulses or emits radiation only sporadically.

They suggest a new name for the new radio source and similar objects they predict will be discovered: "burpers."

Hyman's burper sits in the densest part of the Milky Way, in the constellation of Sagittarius.

Dust between the galactic center and Earth blocks visible light, so astronomers observe the region through other methods, such as radio waves. From radio waves, astronomers can learn about the composition, structure and even motion of cosmic sources.

Over the past decade, astronomers including Hyman have been working on a three-dimensional map of the galactic center. In 2000, Hyman and collaborators at the Naval Research Laboratory turned their attention to images taken in 1998 by radio telescopes searching low frequencies. They noticed something not seen in other images of the same area.

That turned out to be transient emissions from two sources. Transient sources are powerful, energetic

events that come and go, rather than a cyclical burst.

Hyman and colleagues decided to create a monitoring program to pursue more transients in the galactic center. Over the past few years, a handful of Sweet Briar students have monitored some 250 radiation sources.

Last summer, Hyman spotted five bursts of radio emissions from a new source in images taken in 2002 using the Very Large Array telescope in New Mexico. The bursts were of equal brightness. They lasted about 10 minutes, appearing every 77 minutes over a 17-hour period from Sept. 30 to Oct. 1.

The discovery of the new object by monitoring for low-frequency, rather than high-frequency, radio waves suggests there may be more radio rebels to find.

Hyman and his colleagues hope to learn more about the object later this month, when the Very Large Array will search the rebel's neighborhood at other frequencies.

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